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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/694,395	10/28/2003	Young-ju Kim	1793.1063	9200

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EXAMINER

VAN ROY, TOD THOMAS

ART UNIT	PAPER NUMBER
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2828

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/694,395

Applicant(s)

KIM ET AL.

Examiner

Tod T. Van Roy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/28/03, 12/28/04
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Ikeuchi et al. (US 6795656).

With respect to claim 1, the applicant's admitted prior art teaches a laser diode driving circuit comprising: a laser diode driving unit which outputs a laser diode driving current ([0006]), and a laser diode protection unit which sets a limit of the laser diode driving current output from the laser diode driving unit ([0006]). The applicant's admitted prior does not teach the protection circuit to increase the limit of the laser diode driving

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current as an ambient temperature of a laser diode increases. Ikeuchi teaches a driving and protection circuit wherein it is taught to increase the output current based on the ambient temperature of the laser diode (col.11 lines 4-15). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the applicant's admitted prior art with the temperature controlled output current to realize stable operation in a broader range of the change in temperature (Ikeuchi, col.11 lines 15-17).

With respect to claim 2, the applicant's admitted prior art teaches a resistor coupled to an emitter and base of a first transistor that limits the maximum driving current output by the laser diode driving unit (fig.1 R2, [0012]). The admitted prior art does not teach the use of a thermistor. Ikeuchi teaches a thermistor coupled to transistors that limit the output of the laser diode-driving unit (fig.10 TH2). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the resistor of the prior art with a thermistor, as it is well known that a thermistor performs the same function as a resistor (i.e. resistance) as well as to make the limiting circuit a function of temperature to compensate for the reduction of optical power in the laser due to an increase in temperature (Ikeuchi, col.11 lines 40-50).

With respect to claim 3, the prior art additionally teaches a second transistor that outputs a driving current to the laser diode when the second transistor is turned on (fig.1 Q1, [0011]).

With respect to claim 4, the prior art additionally teaches a collector of the first transistor (fig.1 Q2) is coupled to a base of the second transistor (fig.1 Q1) and operates to turn off the second transistor when the first transistor is on ([0010]).

With respect to claim 5, the prior art teaches the use of a resistor, and does not teach the use of a negative temperature coefficient thermistor. Ikeuchi teaches the use of a negative temperature coefficient thermistor (col.11 lines 9-10). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the resistor of the prior art with a negative temperature coefficient thermistor to allow for the increase in drive current due to the decrease in resistance when the ambient temperature rises (Ikeuchi, col.11 lines 9-15).

With respect to claim 6, the prior art teaches laser diode driving circuit comprising: a first transistor which outputs a laser diode driving current (fig.1 Q1), a second transistor (fig.1 Q2) which is turned on and turns off the first transistor when a current flowing through a node of the first transistor reaches a predetermined value ([0010]), the node being other than a node through which the first transistor outputs the laser diode driving current and a node through which the first transistor receives a reference signal, and a resistor (fig.1 R2) which sets the current that turns on the second transistor. The prior art does not teach the use of a thermistor. Ikeuchi teaches a negative temperature coefficient thermistor coupled to transistors that limit the output of the laser diode-driving unit (fig.10 TH2). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the resistor of the prior art with a thermistor, as it is well known that a thermistor performs the same function as a resistor (i.e. resistance) as well as to make the limiting circuit a function of temperature to compensate for the reduction of optical power in the laser due to an increase in temperature (Ikeuchi, col.11 lines 40-50).

With respect to claim 7, the prior art teaches the use of a resistor which limits the output of the drive circuit, but does not teach the use of a negative temperature coefficient thermistor. Ikeuchi teaches a negative temperature coefficient thermistor coupled to transistors that limit the output of the laser diode-driving unit (fig.10 TH2), and control the output power compensating for changes in temperature (col.11lines 40-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the resistor of the prior art with a thermistor, as it is well known that a thermistor performs the same function as a resistor (i.e. resistance) as well as to make the limiting circuit a function of temperature to compensate for the reduction of optical power in the laser due to an increase in temperature (Ikeuchi, col.11 lines 40-50) maintaining a power level independent of temperature.

With respect to claim 8, the prior art teaches a current limited laser diode driving circuit comprising: a laser diode (fig.1 LD), means for controlling an application of a driving current to the laser diode (fig.1 #102); and means for limiting the driving current output from the controlling means so as to increase a limit of the driving current (fig.1 R2, changing this resistance value performs the function of the changing the driving current value). The prior art does not increasing the drive current as an ambient temperature of the laser diode increases. Ikeuchi teaches a driving and protection circuit wherein it is taught to increase the output current based on the ambient temperature of the laser diode (col.11 lines 4-15). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the applicant's admitted prior art with the

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temperature controlled output current to realize stable operation in a broader range of the change in temperature (Ikeuchi, col.11 lines 15-17).

With respect to claim 9, the prior art teaches the driving circuit as outlined in claim 8, including the resistor whose value limits the output current, but does not teach the use of a thermistor to set the operating current of a second transistor. Ikeuchi teaches a thermistor coupled to transistors that limit the output of the laser diode-driving unit (fig.10 TH2). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the resistor of the prior art with a thermistor, as it is well known that a thermistor performs the same function as a resistor (i.e. resistance) as well as to make the limiting circuit a function of temperature to compensate for the reduction of optical power in the laser due to an increase in temperature (Ikeuchi, col.11 lines 40-50).

With respect to claim 10, the prior art additionally teaches a first transistor responsive (fig.1 Q1) to a second transistor (fig.1 Q2) that outputs a driving current to the laser diode when the first transistor is on ([0011]).

With respect to claim 11, the prior art teaches the use of a resistor, and does not teach the use of a negative temperature coefficient thermistor. Ikeuchi teaches the use of a negative temperature coefficient thermistor (col.11 lines 9-10). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the resistor of the prior art with a negative temperature coefficient thermistor to allow for the increase in drive current due to the decrease in resistance when the ambient temperature rises (Ikeuchi, col.11 lines 9-15).

With respect to claim 12, the admitted prior art teaches a method for limiting the driving current applied to a laser diode comprising: passing a current through a resistor (fig.1 R2) to provide an adjustable current (based on chosen value of the resistor), if the adjustable current flowing through the thermistor is below a predetermined threshold, then providing the current to the laser diode through a first transistor, if the adjustable current flowing through the thermistor is above the predetermined threshold, then using a second transistor to turn off the first transistor to prevent the current from reaching the laser diode ([0006-12]). The prior art does not teach the use of a thermistor in place of the resistor. Ikeuchi teaches a negative temperature coefficient thermistor coupled to transistors that limit the output of the laser diode-driving unit (fig.10 TH2). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the resistor of the prior art with a thermistor, as it is well known that a thermistor performs the same function as a resistor (i.e. resistance) as well as to make the limiting circuit a function of temperature to compensate for the reduction of optical power in the laser due to an increase in temperature (Ikeuchi, col.11 lines 40-50).

Conclusion

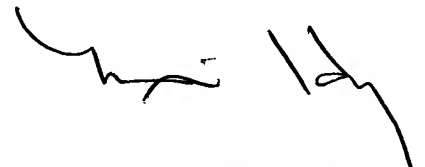
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR



MINSUN OH HARVEY
PRIMARY EXAMINER